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Determinants of Banks' Risk-Taking Behaviours in Africa: A Regulatory Perspective

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Abstract

The intermediation role of banks between borrowers and savers exposes them to various risks which impact their risk appetite and behaviour. Using annual panel data for the period 2010 to 2019, this paper examines the determinants of risk-taking behaviours of banks within the African context. The study sampled 45 listed banks from African nations that have adopted the Basel III regulatory requirements and used the random effect estimator to fit the static panel data models established for the study. The study shows that minimum capital requirements, capital buffer premium and profitability were significant determinants of the risk-taking behaviour of the African banks. However, compared to other variables, the minimum capital requirement remained the most important factor in terms of determining the risk-taking behaviour of the selected African banks. This is because the minimum capital requirement determining measure is more significant across the three measures of the risk-taking behaviour of the African banks compared to others. The study recommends that African banks should establish risk limits, improve risk identification, and establish a platform for bank stress testing by using the key determinants of risk-taking behaviour in making strategic business decisions.

Keywords

African Nations, Banks, Basel III Regulatory Requirements, Panel Data, Random Effect Estimator, Risk-Taking Behaviours

1. Introduction

The role of banks in the stability and growth of an economy cannot be overemphasised. Banking firms are inherently risky and vulnerable as their liabilities, such as demand deposits, are usually short-term and can be withdrawn at any time, while their assets such as mortgages and business loans are long-term and

normally illiquid (King, 2013). The level of risk that those that are charged with the responsibility of directing and controlling the banks are willing to tolerate can either harm or benefit the bank. For instance, the excessive risk-taking behaviour of the Lehman brothers was harmful to the bank and led to the 2008 Global Financial Crisis which invariably had a global impact and far-reaching effect. Also, the risk-taking appetite of banks is influenced by aggressive competition, corporate governance and banking regulations (Huang & Xiong, 2015).

To reduce the likelihood of failures and distress in banking firms, and to promote the economic health of countries and international markets, it is necessary for regimes across the world to regulate bank capital structure and financing decisions. In light of the necessity to regulate bank risk-taking behaviours, the Basel Committee on Banking Supervision (BCBS) established a series of international standards for bank regulations known as the Basel I, Basel II and the most recently Basel III Accord. These Basel Accords are globally acceptable standards of bank capital regulations because the BCBS is the primary global standard-setter for banks' prudential regulation and provides a forum for regular cooperation on banking supervisory matters (Bank for International Settlements, 2013).

Gropp and Heider (2010) argue that the Basel Accords have been influential and instrumental in centralising banking regulation, supervision and capital adequacy standards. Furthermore, due to globalisation, the interdependency of banking operations, and the interconnectedness of banks and businesses among countries, the Basel Accords' global acceptance was inevitable. Moreover, due to the several crises of the 1980s and the increasing internationalisation of the financial systems, an imminent need for a worldwide banking regulation that could provide a uniform platform for banking regulations and operations onshore and offshore with all market participants arises (Nikoo, 2015).

Kombo (2014) alluded that failure to account for the impact of bank regulation on banks' risk-taking behaviour after the 2008 GFC may be misleading in measuring banks' financial health and efficiency. However, empirical studies that have delved into the relationship between bank regulation and risk-taking behaviour are scant and can be categorised as non-existent, especially within the African context. Studies such as those of Ozili (2019) and Nyantakyi and Sy (2015) conducted in Africa identified some practical challenges facing African banks regarding their risk-taking behaviour, performance and stability pre and post-Basel III Accord. Before the implementation of Basel III in Africa, African banks predominantly from the leading countries such as South Africa, Kenya, Morocco, Ghana and Nigeria amongst others faced the challenges of excessive build-up of debt, poor quality of capital reinforcement and poor credit risk management practices leading to higher liquidity shocks, and operational inefficiencies (Nyantakyi & Sy, 2015; Kombo, 2014). More so, African banks are faced with the challenge of volatile risk-taking behaviour with a higher cost of risk, liquidity crisis and non-performing loans leading to ill-financial performance and

instability. Ozili (2019) argued that despite the implementation of the Basel III Accord, African banks still faced several challenges. First, while Basel III focuses on strengthening the bank capital base, a consequential effect of the banks raising more capital to meet the requirements significantly impairs their profitability with the prospect of sacrificing their lending capacity to maintain stability (Nyantakyi & Sy, 2015). Second, the quest of the banks to curtail the excessive build-up of leverage led to reduced profitable operational lending activities which could incentivise banks to focus on high-risk/high-return lending only (Sharma & Baráybar, 2013). Lastly, strengthening the liquidity framework that guides the bank against liquidity crisis, requires them to hold significantly more liquid yet low-yielding assets which negatively impacts their profitability and poses a challenge to their performance and stability (Ozili, 2019; Sharma & Baráybar, 2013).

Thus, this study seeks to investigate the impact of Basel III prudential regulations on the risk-taking behaviour of selected listed African banks. Understanding the roles of different aspects of the Basel III regulatory requirement within the African context is particularly important to establish a course of action in managing the risk-taking behaviours of African bank managers. According to Bank for International Settlements (2013), to manage the heavy risk appetite of banks, there have been some significant changes made to the Basel III Accord. First, the minimum capital requirement as highlighted in Basel II was amended and increased for banks to maintain a buffer of capital that could be used to absorb losses during periods of financial and economic stress. Second, the leverage requirements were improved to include a non-risk-based leverage ratio for the banks to prevent a banking crisis that could cause a lowered leverage which could result in a downward trend of asset prices and bank capital. Finally, the liquidity requirement was amended to include two new liquidity ratios; the liquidity coverage ratio (LCR), and the net stable funding ratio (NSFR). The LCR requires banks to hold sufficient high-liquid assets that can withstand a 30-day stressed funding scenario as specified by the bank supervisor, and the NSFR require banks to maintain stable funding above the required amount for one year of extended stress. The NSFR is primarily designed to address liquidity mismatch in banks and to reduce liquidity crises in case of shocks. This study will investigate the impact of these significant changes on African bank risk-taking behaviour.

Following the brief introduction, the rest of the article is organised as follows: an empirical review of literature, methodology, empirical discussion of results and lastly the conclusions. In the section, empirical review of literature, related literature espousing the relationship between Basel III regulatory requirements and bank risk-taking behaviours was discussed. The section "methodology" presented the data sources, estimation techniques and empirical tests and models. Whilst the section "empirical discussion of results" elaborately presented the results and discussed the research findings. The last section "conclusions" summarised the results in alignment with the research objective and proffer recom-

mendations.

2. Empirical Review of Literature

The term risk, according to Milkau (2017) has been in existence for decades referring to the uncertainty of future outcomes associated with some decision-making. Risks and risk-taking are two co-related while relatively independent concepts. The core intention of enterprise decision-making is to maximise the values under the condition of limited internal resources (Francis & Osborne, 2012). However, during that period companies have to face external uncertainties, which may bring either benefits or losses to them. In commercial banks, the term risk refers to the uncertainties that they face in terms of gains and losses in their business processes (Tan & Floros, 2013).

The Basel III Accord classifies the main bank risks as credit risk, market risk, liquidity risk and operational risk amongst other risks. In the banks' decision-making process, the attitude and amount of risk taken by the decision makers depend largely on their risk appetite, consideration of other internal and external factors as well as on other prudential regulatory guidelines such as the Basel III Accord (Klomp & Haan, 2012). Haq and Heaney (2012) define risk as an appetite for selection among a variety of alternatives with different levels of uncertainties. They indicate that the risk-taking behaviour of banks refers to their appetite to choose, among varieties of projects, investments or ventures with different levels of uncertainties and expected cash flows. Saldías (2013) argues that the level of risky decisions available to and made by banks as regards investments, projects and or ventures is greatly important as it determines their performance. As a result, banks have to make appropriate risk choices to maximise and maintain their performance in the form of profitability, stability and efficiency (Demirguc-Kunt, Detragiache, & Merrouche, 2013).

The study of Karim, Hassan, Hassan and Mohamad (2014) showed that there was a significant relationship between the level of bank capital and the risk-taking behaviour of banks. According to Nazir, Daniel and Nawaz (2012), the majority of the studies conducted in Europe and the U.S. banking sectors showed a positive relationship between the Basel III capital regulatory requirements and the bank's risk-taking. This implies that highly capitalised banks have no excess available capital at their disposal and that protects them from making unnecessary or risky investment and business decisions. The investment decisions are carefully made after elaborate scrutiny of the risk level and probable returns. Similarly, Jokipii and Milne (2011) used a sample of US banks and found a positive association between capital and risk-taking behaviour of highly capitalised banks. Moreover, Karim et al. (2014) conducted a study on 26 banks in Pakistan and found that the Basel III capital requirements had a significant and positive effect on the risk-taking behaviour of banks, both in the long run as well as, in the short run. Specifically, the results of their study revealed that the capital adequacy ratios (a proxy for bank capital), and the ratio of risk-weighted assets

(a proxy for risk-taking) along with the bank size; interest rate and profitability ratios were interrelated in the long run. Their estimated long-run coefficients showed that the effect of capital on risk-taking behaviour was positive and significant.

In another study, Klomp and Haan (2012) explored the impact of Basel III regulatory requirements on the bank's risky assets. By doing an estimation using data from the European banks, they concluded that increases in bank capital requirements reduced the overall risk-taking behaviour of banks. They further explained that the limited capital requirements could strongly restrict the banks to take a risk and also, significantly decrease the non-performing loans. Similarly, Lee and Hseih (2013) used the data from Asian banks to explore a statistical relationship between the level of capital and the risk of banks by using the generalized method of moments (GMM) estimation technique. They concluded that bank capital was significantly and positively related to the risk-taking behaviour of banks. They justified their findings by stating that a higher level of capital would lead to enhanced profits for banks and in turn the banks would take more risk.

By using a sample of banks in the OIC countries, Karim et al. (2014) confirmed a positive association between the banks' risk-taking behaviours and capital levels. The OIC countries have a mixed banking of large capital-based banks and small capital-based banks. Karim et al. (2014) therefore, estimated the model for the two types of banks aforementioned separately. Their results suggested that with an increase in bank capital, the small capital-based banks tended to make more investment decisions on risky assets because they had a high appetite to grow and survive in the competing markets. Ha and Quyen (2018) indicate that banks facing lower funding liquidity risk, based on the Basel III liquidity requirements, take more risk. They further posit that banks with higher deposits do not have liquidity problems in the short term and will not be under pressure to take risks that could give rise to a liquidity crisis, hence, have a lower risk appetite. However, a bank facing a liquidity problem is under pressure and will have a higher risk-taking behaviour in an attempt to respond to the profitable expectations of owners, investors, or related others.

Tabak, Fazio, and Cajueiro (2013) focused on how bank size and market concentration affect performance and risk-taking behaviour under the Basel III regulatory guideline of 17 Latin American banks. On one hand, their study found that large-size banks have benefitted more from their risk-taking behaviours than small banks. On the other hand, bank size may also be negatively related to banks' risk-taking behaviours. Under the Basel III Accord, banks are allowed to choose based on their actual situation between the standard method and internal rating method in calculating their capital adequacy ratio which is a measure of Basel III regulatory capital. This choice or selection entitles large-based capital banks to enjoy a more competitive advantage with an overall lower appetite for risk-taking. Similarly, Hakenes and Schnabel (2011) analysed the relationship

between bank size and risk-taking under the Basel III Accord with an internal rating-based (IRB) method. The findings of their study showed that smaller banks had higher risk-taking behaviour under the framework of the Basel III Accord as compared to larger banks. They justified their findings by stating that small banks were risk-takers with high appetites and zeal to grow and compete within the available market.

On the contrary, Ashraf, Arshad and Hu (2016) and Tan and Floros (2013) found that capital adequacy requirements (CAR) were negatively and significantly related to the risk-taking behaviour of Chinese banks. They argued that banks with higher liquidity preferred to maintain higher levels of capital. Furthermore, Bouheni, Ameur, Cheffou and Jawadi (2014) concluded that minimum CAR could decrease the level of risk in banks as it serves as the minimum threshold that banks' capital should not fall below in the usage or holding of their capital. Moreover, they explained that the CAR might increase profitability and boost the performance of European banks because it determined their risk-taking behaviour. Moreover, Jokipii and Milne (2011) used a sample of U.S. banks and found a negative association between capital and risk-taking for banks with marginal capital adequacy ratios.

Rahman, Chowdhury and Dey (2018) analysed the relationship between risk-taking behaviour, Basel III capital regulations, and performance in the banking sector of Bangladesh. Their study employed panel data with an observation from 38 commercial banks for the period of 2007-2016. They employed the GMM estimation technique. Their findings revealed that there was a significant and negative relationship between risk-taking and capital regulation. Their findings imply that banks might be risk averse in considering the impact of the Basel III regulations on their risk appetite and performance.

In another study, Nguyen (2020) studied the impact of minimum capital requirements on the risk-taking behaviour of Chinese banks, using bank-level panel data. Specifically, a sample of 171 Chinese banks was used in the study. The study found that capital was significantly and negatively associated with the risk-taking activities of the sampled banks. They justified their findings by stating that high capital requirements could constrain banks from taking a high risk. Similarly, Selma-Mokni, Rajhi and Rachdi (2016) analysed the data of 30 commercial banks in the MENA region. They concluded that capital adequacy ratios and investment in risky assets were significantly and negatively associated. Further research by Milkau (2017) and Karim et al. (2014) found that the Basel III regulatory requirements had a positive impact on the risk-taking behaviour of banks whilst studies by Rahman et al. (2018), Ha and Quyen (2018), Ashraf et al. (2016), Selma-Mokni et al. (2016) and Lee and Hseih (2013) concluded that the Basel III regulatory requirements had a negative impact on the risk-taking behaviour of the banks. In line with the previous findings, and despite the controversial results of various authors, the current study expects Basel III regulatory requirements to have a negative impact on the risk-taking behaviour of banks.

This is justifiable based on the premise that the overarching aim of the Basel III Accord is to promote risk management and enhance risk coverage within the bank through a higher and tighter capital requirement amongst others.

3. Methodology

3.1. Data and Variables

The study used audited bank-level financial data obtained from the IRESS database. Only listed banks in Africa that have adopted the Basel III regulatory framework from South Africa, Nigeria, Kenya, Tanzania, Uganda and Malawi were used as sample banks in this study. The sample consisted of 45 listed commercial banks from these 6 African nations, covering the period from 2010 to 2019. The study measured the risk-taking behaviours of banks in three ways. First, it did so by using the ratio of risk-weighted assets to total assets (RWATA). Second, by calculating the ratio of non-performing loans to total loans (NPLTL); and finally, by using the natural log of the banks' Z-score (LNZ-score) (Rahman et al., 2018; Ashraf et al., 2016; Rajhi & Hassairi, 2013; Tan & Floros, 2013).

Lending to the perspective of the Basel III regulatory framework the following parameters minimum capital requirement (MCR), capital adequacy ratio (CAR), capital buffer premium (CBP), and liquidity requirements (LCR) are set out for adoption by the Basel Committee to regulate the banking operations globally (BIS, 2013). Based on this premise, the current study adopts these parameters in its study of risk-taking behaviour determinants within the African perspective and used the return on assets (ROA) as a measure of bank profitability. See Table 1 for the parameter description.

3.2. Econometric Model

The study used a static panel data regression model to examine the relationship

Table 1. Description of variables.

S/N	Variables	Acronym	Variable Measurement
		Dependent Variables	
1	Risk Taking Behaviour	RTB	RWATA = Risk Weighted Asset/Total Asset. NPLTL = ratio of non-performing loan to total loan. LNZ-score = Natural Log of Z-Score
		Basel III regulatory requirements: Independent Variables	
2	Minimum Capital Requirement	MCR	Minimum ratio of Tier 1 + Tier 2
3	Capital Adequacy Ratio	CAR	Tier 1 + Tier 2/Risk Weighted Asset
4	Capital Buffer Premium	CBP	Actual capital (core capital plus supplementary capital) less minimum regulatory capital.
5	Liquidity Requirements	LCR	HQLA/ENCO
6	Profitability	P	ROA = ratio of profit after taxes to total assets.

Source: Authors Compilation (2022).

between Basel III regulatory requirements and risk-taking behaviours of selected listed banks in Africa as adopted by Malik and Rafique (2013), Melese (2015) and Shumet (2016). To account for autocorrelation, non-stationary, and heteroscedasticity in the model and estimation technique used, the study performed the multicollinearity, heteroscedasticity and cross-sectional independence tests.

There are some estimators used in constructing a static panel data model, such as pooled ordinary least squares (OLS), fixed effect (FE), and random effect (RE) (Francis & Osbome, 2012; Lee & Hsieh, 2013). The pooled OLS estimator, on the one hand, uses a constant intercept across all cross-sectional units and assumes the same slope and intercepts for all observations (Torres-Reyna, 2007). Thus, the estimator suffers from the problem of unobserved heterogeneity between units of analysis. However, this problem can be easily solved by differentiating the dataset. FE estimation, on the other hand, assumes that the sample is not random and the variables have constant slopes but different intercepts in the cross-section and can handle unbalanced panel data. The main problem with the FE estimator is that of time-constant heterogeneity, which can be overcome by introducing dummy variables, usually referred to as least squares dummy variable (LSDV) estimators (Arellano & Bover, 1995). The RE estimator is used to address the assumption that the error term follows classical assumptions so that individual differences in the variable intercepts are captured by the error term. The main advantage of the RE estimator is that it preserves both observed individual heterogeneity and n-degrees of freedom in the regression model, whereas FE estimators decay and lose individual heterogeneity and n-degrees of freedom (Dougherty, 2006).

F-test, Hausman-Wu, and Breusch and Pagan tests were performed to select the appropriate estimator among pooled OLS, FE, and RE to fit the static model equation. These models, estimates, and statistical tests were implemented in STATA 15 econometric software. Taking into account the adopted methodology, the following models were specified to test the relationship between the Basel III regulatory requirements and African banks' risk-taking behaviour.

Model Equation (1)

$$\mathrm{RWATA}_{ijt} = \beta_0 + \beta_1 \mathrm{MCR}_{ijt} + \beta_2 \mathrm{CAR}_{ijt} + \beta_3 \mathrm{CBP}_{ijt} + \beta_4 \mathrm{LR}_{ijt} + \beta_5 \mathrm{LCR}_{ijt} + \beta_6 \mathrm{P}_{ijt} + \varepsilon_{ijt}$$

Model Equation (2)

$$\mathrm{NPLTL}_{ijt} = \beta_0 + \beta_1 \mathrm{MCR}_{ijt} + \beta_2 \mathrm{CAR}_{ijt} + \beta_3 \mathrm{CBP}_{ijt} + \beta_4 \mathrm{LR}_{ijt} + \beta_5 \mathrm{LCR}_{ijt} + \beta_6 \mathrm{P}_{ijt} + \varepsilon_{ijt}$$

Model Equation (3)

$$\mathrm{LNZ\text{-}score}_{ijt} = \beta_0 + \beta_1 \mathrm{MCR}_{ijt} + \beta_2 \mathrm{CAR}_{ijt} + \beta_3 \mathrm{CBP}_{ijt} + \beta_4 \mathrm{LR}_{ijt} + \beta_5 \mathrm{LCR}_{ijt} + \beta_6 \mathrm{P}_{ijt} + \varepsilon_{ijt}$$

In the above model equations, the β_0 represents the intercept/slope parameters, while $\beta_{1\text{-}6}$ represents the coefficient of the variables and ε_{ijt} represents the

error term. Model Equation (1) examines whether the risk-taking behaviour of banks, which is represented by the ratio of a risk-weighted asset to the total asset (RWATA), was affected by its profitability and the Basel III regulatory requirements. Whereas model Equation (2) examines whether the risk-taking behaviour of banks which, is represented by the ratio of non-performing loans to total loans (NPLTL), was affected by its profitability and the Basel III regulatory requirements. Finally, Equation (3) tests the extent to which the risk-taking behaviour of banks, which is represented by the natural log of the banks' Z-score (LNZ-score), was affected by its profitability and the Basel III regulatory requirements. To fully understand the abbreviations and acronyms used in the model equations, see Table 1.

4. Empirical Results

To carry out the data analysis in this study, static panel data and econometric methodology using STATA 15 were employed.

4.1. Summary Statistics

Table 2 reports summary statistics for the main variables. The mean value of 72.33% of RWATA shows that on average, the sampled banks have allocated 72.33% of their total assets to risk-weighted assets. The mean value of NPLTL is 107.44% which exhibits a similar trend as RWATA while the mean value of the Lnz-score is 4.20%. This suggests that on average, the risk-taking behaviours of the African banks in this study were low. This is because the banks had a higher percentage of total assets and total loans compared to the risk-weighted asset and non-performing loans respectively and a lower mean percentage of Lnz-score (Rajhi & Hassairi, 2013; Fiordelisi & Mare, 2014).

Also, it can be concluded that the MCR, CAR, CBP and LCR of African banks are on average 13.59%, 29.37%, 15.78% and 181.72% respectively. First, the higher

Table 2. Summary statistics and normality test results of the variables.

Variables	Mean	Standard deviation	Minimum	Maximum	Skewness	Kurtosis
RWATA	0.7233	2.0019	0.0021	23.6127	0.0769	0.7698
NPLTL	1.0744	3.7446	0.0027	43.3967	0.0713	0.6418
LNZ-score	0.0420	0.0147	0.0016	0.0971	0.0049	0.0432
MCR	0.1359	0.0620	0.0628	0.2090	0.0054	0.0204
CAR	0.2937	0.1851	0.1056	0.4818	0.0156	0.0518
CBP	0.1578	0.1231	0.0428	0.2728	0.0950	6.0737
LCR	1.8172	1.1984	0.7053	2.6991	0.0251	0.1170
P	0.0279	0.0185	0.0004	0.1793	0.0284	0.2153
No of Obs.	450					

Source: Authors Compilation (2022).

MCR means that African banks maintain Tier 1 and Tier 2 capital of 13.59% on average, which is more than the minimum capital requirements set out in the Basel III Enhanced Capital Regulatory Framework (BIS, 2013). Second, the higher CAR indicates that African banks are maintaining their capital adequacy ratio well above the 8% CET 1 ratio and Tier 1 capital ratio prescribed by Basel III. Moreover, a comparison of CAR and MCR shows that African banks held higher protective capital overall. Finally, a high LCR means that in the period under review, African banks held liquid assets above the LCR threshold to withstand liquidity pressure. This reduces the chances of a future banking crisis and the associated losses in economic performance in the short term.

Table 2 presents the summary statistics for the dependent and independent panel data variables.

The panel data variables were created from the data extracted from the yearly financial reports that were gotten from the IRESS database.

4.2. Static Panel Data Regression Output

Choosing a suitable estimator between the pooled OLS, FE and RE estimator for the bank efficiency model, the F-test, Breusch and Pagan test and the Hausman specification tests was performed. The results of the F-test and Breusch and Pagan tests conducted on the RWATA, NPLTL and LNZ-score regression model were statistically significant. This suggests that fixed and random effects exist in the regression model. Hence, the pooled OLS estimator was dropped and the Hausman specification test was used to arrive at a suitable estimator between FE and RE for the regression model. The p-values of the Hausman specification tests were statistically insignificant for the RWATA, NPLTL and LNZ-score regression models. Therefore, the H_0 was not rejected in favour of the fixed effects. Hence, the random effects estimator was favoured and used to report the results of the RWATA, NPLTL and LNZ-score regression model.

The regression model result, F-test, Breusch and Pagan test and Hausman specification test results are shown in Table 3 below. The markings ***, **, and * indicate significance levels at 1%, 5% and 10% respectively.

Table 3 shows the regression results of the risk-taking behaviour specification model. The Table shows the estimation results for the relationship between the risk-taking behaviour of African banks and the Basel III regulatory requirements. The risk-taking behaviour was measured by **RWATA**, **NPLTL** and **LNZ-score**. The regression model was fitted with the RE estimator and all the coefficients were estimated at a 99% confidence level. The z-statistics for the RE model are presented in parentheses. Estimation results in Table 3 show that there is a relationship between the Basel III regulatory requirements and the risk-taking behaviours of African banks. On the one hand, the coefficients of minimum capital requirement (MCR), capital buffer premium (CBP) and profitability (P) are positive and significant at the 1% and 5% levels. This indicates a positive relationship with the risk-taking behaviours of African banks. This suggests that an increase

Table 3. The determinants of banks' risk-taking behaviour.

Variables	Random effects Model		
	RWATA	NPLTL	LNZ-score
MCR	2.8541 (1.41)	9.5042** (1.75)	0.0356** (1.74)
CAR	−2.3013** (−2.39)	−2.1419 (−1.09)	−0.0115* (−1.86)
CBP	3.5336** (2.18)	1.1483 (0.25)	−0.0028 (−0.16)
LCR	0.1035 (1.26)	0.0003 (0.00)	−0.0026*** (−3.05)
P	39.6564*** (0.000)	11.200 (0.91)	0.0667 (1.47)
Obs.	450	450	450
Adjusted R^2	0.2608	0.4890	0.4201
BP L-M statistics	606.41***	125.41***	38.81***
Hausman Test:			
Chi^2-value	5.57	4.96	10.44
Prob > chi^2	0.4733	0.5496	0.1073

Source: Authors Compilation (2022).

in the MCR, CBP and profitability resulted in a consequential increase in the risk-taking behaviour of banks. This is because African banks tend to make higher risky decisions on probable high-yielding investments, knowing they are well cushioned with their high capital base and buffer premiums. This result is similar to the findings of Karim et al. (2014) and Nazir et al. (2012) who found that the majority of the studies conducted in Europe and the U.S. banking sectors showed a positive relationship between the Basel III regulatory requirements and the banks' risk-taking behaviours. They concluded that highly capitalised and profitable banks had some level of confidence to make a risky decision as they believed their buffer capital would serve as a cushion against probable loss arising from those risky investment decisions. However, in the light of forward-looking thinking, there could be a potential counter effect of the increased bank risk-taking behaviour to customer lending, which may invariably affect the banks' financial performance. Similarly, Jokipii and Milne (2011) used a sample of US banks and found a positive association between capital and risk-taking behaviour of highly capitalised banks. In yet another study on 26 banks in Pakistan, Kombo (2014) found that the Basel III capital and liquidity requirements had a significant and positive effect on the risk-taking behaviour of banks, both in the long run as well as, in the short run.

On the other hand, the coefficients of capital adequacy ratio (CAR) and li-

quidity coverage ratio (LCR) are negative and significant at the 1% and 5% levels. This indicates a negative relationship with the risk-taking behaviours of African banks. This suggests that an increase in the CAR and LCR resulted in a consequential fall in the risk-taking behaviour of banks and vice versa. This result is similar to the findings of Klomp and Haan (2012) and Agoraki, Delis and Pasiouras (2011), who explored the impact of Basel III regulatory requirements on the banks' risk behaviours; and concluded that an increase in bank capital and liquidity requirements reduce the overall risk-taking behaviour of banks. They further explained that the limited capital requirements could strongly restrict the banks to take a risk and, significantly decrease the non-performing loans. On a similar note, Ha and Quyen (2018) argue that banks facing lower funding liquidity risk based on the Basel III liquidity requirements will take more risk. They further explain that banks with higher deposits will not have liquidity problems in the short term and will not be under pressure to take risks that could give rise to a liquidity crisis, hence, have a lower risk appetite. However, banks facing liquidity problems are under pressure and have higher risk-taking behaviour in an attempt to respond to the profitable expectations of owners, investors, or related others. Furthermore, Ashraf et al. (2016) and Tan and Floros (2013) found that the capital adequacy ratio (CAR) is negatively and significantly related to the risk-taking behaviour of Chinese banks. In the same light, Lee, Ning and Lee (2015) studied the impact of capital adequacy ratio on the risk-taking behaviour of Chinese banks, using bank-level panel data. They found that capital was significantly and negatively associated with the risk-taking activities of the sampled banks because high capital requirements constrain banks from taking a high risk.

5. Conclusion

The study employed the RE static panel-based estimator to explore the determinants of banks' risk-taking behaviour in the African context. The study used 45 listed banks from six African nations that have adopted the Basel III Accord. The findings of this study showed that minimum capital requirements, capital buffer premium and profitability were significant determinants of the risk-taking behaviour of African banks. However, compared to other variables, the minimum capital requirement remained the most important factor in terms of determining the risk-taking behaviour of the selected African banks. This is because the MCR determining measure is more significant across the three measures of the risk-taking behaviour of the African banks compared to others. This suggests that a high MCR translates to the high risk-taking behaviour of banks. In other words, the selected African banks embarked on risky investments without fear of financial distress or capital crunch. This study, thus, assists African banks to establish risk limits, improve risk identification, and establish a platform for bank stress testing, financing decisions, as well as other strategic business decisions. These findings will equip the bank manager, policymakers, and regulators, pro-

viding them with relevant information and guidance for factors to consider by African bank regulators and CEOs in making informed decisions regarding their risk-taking behaviour.

Despite the importance and relevance of this study, it has certain limitations that conditioned it. The first limitation is the small size of the sample, which consisted of only 45 listed commercial banks. Indeed, the study focused only on African countries that adopted the Basel III regulatory framework. Future studies may use a larger sample size with the expectation that other African countries would have adopted Basel III regulatory requirements by then. Finally, the study is limited to some regulatory requirements of Basel III, such as minimum capital requirements, capital adequacy ratio, capital buffer premium and liquidity requirement. These parameters have largely been inculcated into African banking operations. It is recommended that future studies test the relevance of other revised parts of Basel III regulatory requirements, such as minimum haircuts for securities financing transactions, a standardized approach to credit risk mitigation, a credit valuation adjustment framework, securitization of non-performing loans, and among many other models for counterparty credit risk, provided they are adopted in the African context, as they may prove to be important. The current study could not take into account these revised sections, as they are changes that will mostly come into force from 2023.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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